Release Notes for Cisco IOS Release 12.0(10)W5(18b) Feature Packs for the Cisco Catalyst 8510 MSR and LightStream 1010 ATM Switch

November 13, 2000

These release notes describe the Cisco IOS Release 12.0(10)W5(18b) feature pack for the Catalyst 8510 MSR and LightStream 1010 ATM switch. This software is based on Cisco IOS Release 12.0(10).

Note All information pertains to both the Catalyst 8510 MSR and LightStream 1010 ATM switch platforms, unless differences between the platforms are noted in the text.

Note You can find the most current Cisco IOS documentation on Cisco Connection Online (CCO). These electronic documents may contain updates and modifications made after the hardcopy documents were printed. For more information about CCO, refer to "Cisco Connection Online" section on page 14.

Contents

This document includes the following sections:

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Introduction

This section describes how to use these release notes and the feature pack components.

How to Use These Release Notes

The tables in these release notes contain details about the Cisco feature packs. Use these tables to perform the following tasks before loading a software image onto a router:

1. Use Table 1, “Catalyst 8510 MSR and LightStream 1010 Default Memory and Upgrade Options,” for the feature set memory requirements, factory-default memory, and available memory upgrades for your Catalyst 8510 MSR and LightStream 1010 ATM switches.
2. Use Table 2, “Supported Interface Modules for the Catalyst 8510 MSR and LightStream 1010,” to identify the software image you want to load.
3. Use Table 3, “Feature Pack Product Numbers Quick Reference List,” to identify your feature pack and the memory required for your feature set, based on the image you load.
4. Use the tables in the “Feature Set Tables” section on page 6 to identify which features are supported in a feature set image.

Feature Pack Components

A feature pack is a box that typically contains the following items:

- A CD-ROM with the following software:
  - Cisco IOS feature set software images that can include bundled modem firmware.
  - Router Software Loader (RSL) program (a Windows 95 application) that loads images onto your Catalyst 8510 MSR and LightStream 1010 ATM switches.
  - Trivial File Transfer Protocol (TFTP) server application (for Windows 95 only).
- Getting Started with the Router Software Loader.

Note Before running RSL, see the “Alternatives to RSL” section on page 10. If you cannot use RSL to load images, you can follow the instructions in the “Alternatives to RSL” section on page 10.

- Release notes (this document).
- Other configuration or command references, if available.
- Software license for using Cisco software in object code form on a single access server or router.
- Documentation CD-ROM that contains all Cisco documentation.

System Requirements

This section describes the following topics:

Memory Defaults and Upgrade Options

Table 1 Catalyst 8510 MSR and LightStream 1010 Default Memory and Upgrade Options

Memory Type	Catalyst 8510 MSRP[1] Defaults	LightStream 1010 ASP[2] Defaults	Upgrade Options
Flash memory	16 MB	16 MB	MEM-ASP-FLC16M= MEM-ASP-FLC20M=
DRAM	64 MB	32 MB (FC1) 64 MB (FCPFQ)	None

1. MSRP = Multiservice Switch Route Processor
2. ASP = ATM Switch Processor

Hardware Supported

Cisco IOS Release 12.0(10)W5(18b) supports the Catalyst 8510 MSR and LightStream 1010 ATM switches. The following table lists the interface modules supported:

Table 2 Supported Interface Modules for the Catalyst 8510 MSR and LightStream 1010

Part Description	Part Number
Catalyst 8510 ATM Router Module	
ATM router module (ARM)	C8510-ARM-64K
Catalyst 8510 Layer 3[1] Gigabit Ethernet Interface Modules	
1-port Gigabit Ethernet 16K	C85GE-1X-16K
1-port Gigabit Ethernet 64K	C85GE-1X-64K
ACL Daughter Card (spare)	C8510-ACL=
Catalyst 8510 Layer 3 Fast Ethernet Interface Modules	
8-port 10/100 RJ-45 16K	C85FE-8T-16K
8-port 10/100 RJ-45 64K	C85FE-8T-64K
8-port 100-FX MT-RJ 16K	C85FE-8F-16K
8-port 100-FX MT-RJ 64K	C85FE-8F-64K

Table 2 Supported Interface Modules for the Catalyst 8510 MSR and LightStream 1010 (continued)

Carrier Modules (required for PAMs)	
Carrier module for ATM port adapter modules (PAMs)	WATM-CAM-2P
Port Adapter Modules	
Voice Port Adapters	
4-port T1 (circuit emulation) with RJ-48 interface PAM	WAI-T1C-4RJ48
4-port E1 (circuit emulation) with RJ-48 interface PAM	WAI-E1C-4RJ48
4-port E1 (circuit emulation) with BNC interface PAM	WAI-E1C-4BNC
Frame Relay Port Adapters	
1-port Channelized DS3 Frame Relay	C85MS-1DS3-FRBNC
4-port Channelized E1 Frame Relay	C85MS-4E1-FRRJ48
ATM Port Adapters	
1-port STS-12c/STM-4c SM LR PAM	WAI-OC12-1SSLR
1-port STS-12c/STM-4c SM PAM	WAI-OC12-1SS
1-port STS-12c/STM-4c MMF PAM	WAI-OC12-1MM
4-port STS-3c/STM-1 single-mode (SM) long reach (LR) PAM	WAI-OC3-4SSLR
4-port STS-3c/STM-1 SMF PAM	WAI-OC3-4SS
OC-3 mix PAM, 1-port SM IR and 3-port MM ports	WAI-OC3-1S3M
4-port STS-3c/STM-1 MMF PAM	WAI-OC3-4MM
4-port STS-3c/STM-1 UTP-5 PAM	WAI-OC3-4U5
4-port DS3 PAM	WAI-T3-4BNC
4-port E3 coaxial cable with BNC interface PAM	WAI-E3-4BNC
4-port ATM25 PAMs - note C8510/LS1010 only	C85MS-ATM25-4P
C8510/LS1010 8-port TI IMA PAM	C85MS-8T1-IMA
C8510/LS1010 8-port E1 120 ohm IMA PAM	C85MS-8E1-IMA-120
4-port T1 (ATM) with RJ-48 interface PAM	WAI-T1-4RJ48
4-port E1 (ATM) with RJ-48 interface PAM9	WAI-E1-4RJ48
4-port E1 (ATM) with BNC interface PAM	WAI-E1-4BNC

1. Layer 3 requires the Catalyst 8510 ATM router module (ARM).

Software Compatibility

The feature pack described in this release note contains Cisco IOS Release 12.0(10)W5(18b) software images and Router Software Loader (RSL) Version 7.10.

Determining Your Software Release

To determine the version of Cisco IOS software running on your Catalyst 8510 MSR or LightStream 1010, log in to the switch, and enter the **show version** user EXEC command.

```
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) LS1010 WA4-5 Software (LS1010-WP-M), Version 12.0(10)W5(18b)
Copyright (c) 1986-2000 by cisco Systems, Inc.
```

Product Numbers Quick-Reference List

Table 3 Feature Pack Product Numbers Quick Reference List

Product Number	Feature Pack Description
CDL10R2-12.0.10W=	LightStream 1010 IISP and PNNI Feature Set
CD851R2-12.0.10W=	Catalyst 8510 Integrated ATM and Layer 3 Feature Set

Feature Pack Overview Table

Table 4 Catalyst 8510 MSR and LightStream 1010 Feature Packs

		Image Name(s)		Recommended Memory	
Product Number	CD-ROM Title	UNIX	DOS	Flash	Main
CDL10R2-12.0.10W=	LightStream 1010 IISP and PNNI Feature Set Cisco IOS Release 12.0(10)W5(18b)	ls1010-wp-mz.120-10.W5.18b.bin	aaa1585	16MB	64MB
CD851R2-12.0.10W=	Catalyst 8510 Integrated ATM and Layer 3 Feature Set Cisco IOS Release 12.0(10)W5(18b)	cat8510m-wp-mz.120-10.W5.18b.bin	aaa1586	16MB	64MB

Feature Set Tables

Table 5 Feature Sets Supported by the Catalyst 8510 MSR and LightStream 1010 ATM Switch

Feature Set
Left-justified E.164 AFI support
SNMP[1]
Asynchronous support
PPP[2] (SLIP[3]/PPP)
IP[4]
NTP[5]
TACACS+[6]
Telnet
Point-to-point and point-to-multipoint permanent VCCs[7] and VPCs[8]
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 3.0)
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 3.1)
Point-to-point and point-to-multipoint switched VCCs and VPCs (UNI 4.0)
Multipoint-to-point UNI signaling
Soft VCCs and VPCs
VP tunneling
VPI/VCI range support in ILMI 4.0
PNNI hierarchy
ILMI version 4.0
IISP[9]
LANE[10] client (LEC[11]) and LANE Services (LES[12]/BUS[13]/LECS[14]) on ASP[15]
ATM ARP[16] server on MSRP[17] or ASP
ATM ARP client on MSRP or ASP
ATM tag switch router (TSR)
Port snooping
OAM[18] F4 and F5
E.164 address translation
E.164 autoconversion
Circuit emulation
ATM access lists
ATM accounting
ATM RMON[19]
Multiple, weighted, dynamic thresholds for selective packet marking and discard
Shaped VP tunnels for CBR traffic (MSRP or FC-PFQ only)

Table 5 Feature Sets Supported by the Catalyst 8510 MSR and LightStream 1010 ATM Switch (continued)

Feature Set
Substitution of other service categories in shaped VP tunnels (MSRP or FC-PFQ feature cards only)
Dual leaky bucket policing (MSRP or FC-PFQ feature cards only)
Scheduler/Service Class/PVC configuration (MSRP or FC-PFQ feature cards only)
Logical multicast support (up to 254 leaves per output port, per point-to-multipoint VC) (MSRP or FC-PFQ feature cards only)
Network clocking enhancements for smooth switchover (MSRP or FC-PFQ feature cards only)
Per-VC or per-VP nondisruptive snooping (MSRP or FC-PFQ feature cards only)
Support for non-zero MCR[20] on ABR connections (MSRP or FC-PFQ feature cards only)
Access lists on ILMI registration
CUGs
ATM soft restart
ATM accounting enhancements
CISCO-SYSLOG-MIB support
CISCO-CONFIG-COPY-MIB support
Signaling diagnostics and MIB
Supplemental AToM MIB
Channelized E1 and DS3 Frame Relay Port Adapters
Frame Relay to ATM Interworking Features on the Frame Relay Port Adapters
Hierarchical VP Tunnels
Remote logging for accounting
Tag Switching VC-Merge on Non-UBR VP Tunnels and Hierarchical VP Tunnels
PNNI Complex Node Representation
Support for ATM-Fabric Integration Module in Catalyst 5500
PNNI explicit paths
PNNI alternate link selection
Tag switching CoS
Network Clock Distribution Protocol
Simple Gateway Control Protocol
Inverse Multiplexing over ATM (IMA) groups
ATM End System Address (AESA) gateway
ATM overbooking
Framing overhead
NCDP MIB support
ACL support via ACL daughter card
L3-ATM routing and bridging via RFC 1483 (ATM router module)[21]

1. SNMP = Simple Network Management Protocol.

2. PPP = Point-to-Point Protocol.
3. SLIP = Serial Line Internet Protocol.
4. IP = Internet Protocol.
5. NTP = Network Time Protocol.
6. TACACS+ = Terminal Access Controller Access Control System Plus.
7. VCCs = virtual channel connections.
8. VPCs = virtual path connections.
9. IISP = Interim-Interswitch Signaling Protocol.
10. LANE = LAN Emulation.
11. LEC = LAN Emulation Client.
12. LES = LAN Emulation Server.
13. BUS = broadcast and unknown server.
14. LECS = LAN Emulation Configuration Server.
15. ASP = ATM switch processor.
16. ARP = Address Resolution Protocol.
17. MSRP = Multiservice Switch Route Processor
18. OAM = Operation, Administration, and Maintenance.
19. RMON = Remote Monitoring.
20. MCR = minimum cell rate.
21. UNI = User-Network Interface
22. ILMI = Integrated Local Management Interface
23. CBR = constant bit rate
24. ABR = available bit rate
25. MIB = Management Information Base
26. UBR = unspecified bit rate

21. You can download the Catalyst 8510 MSR software image on a LightStream 1010 ATM switch to support L3-ATM (via ATM router module). However, the LightStream 1010 ATM switch software image does not include support for the ATM router module.

Installation Notes

This section describes the following topics:

Image Installation Tips and Troubleshooting When Using RSL

Image Installation Tips

The following information about RSL operations can help you with the installation process:

- If you are loading software on a preconfigured Catalyst 8510 MSR or LightStream 1010, save the configuration file on your PC before running RSL.
- If you have added any static entries to the PC Address Resolution Protocol (ARP) table, one or more of them might be deleted by RSL. Manually reenter any deleted entries in the PC ARP table.

- During a connection, if the Catalyst 8510 MSR or LightStream 1010 running configuration is not the same as its startup configuration, the exact configuration is not restored. Any changes that you made since the last time you entered **copy running-config startup-config** or **write memory** commands are lost.
- RSL restores the Catalyst 8510 MSR and LightStream 1010 startup configuration, but some running configuration commands are not restored. To restore the exact running configuration, reboot the router. The following interface configuration commands are not restored to the running configuration:
  - **no shutdown**
  - **no ringspeed**
  - **media-type aui**

Recovering from a Connection Error

If any of the following elements apply to your installation, modify the Short Timeout value from the Options dialog box in RSL:

- You are connecting to a Catalyst 8510 MSR and LightStream 1010 that has a large configuration file.
- You see the following error message:

```
"Failed to configure the router to enable the Cisco IOS software image and configuration
file upload and download operations. You may want to check the router to make sure that
the selected interface exists."
```

If you are connecting to any other router or access server, increase the Short Timeout to a value over 25 seconds.

Note If you change the timeout value, you must do so before connecting to the Catalyst 8510 MSR and LightStream 1010 ATM switches, or the new value will not be used. Also, increasing the Short Timeout value can increase the time it takes for RSL to connect to the target Catalyst 8510 MSR and LightStream 1010 ATM switches.

Restoring the Startup Configuration

In some cases, RSL is unable to restore the startup configuration. If this happens, follow these steps:

Step 1 Ensure that all cables are properly attached to both the Catalyst 8510 MSR and LightStream 1010 and the PC.

Step 2 Restart RSL and connect by using the **Preconfigured router** option.

Step 3 When asked if you want to overwrite the existing startup configuration file, choose **no**.

Step 4 When asked if you want to continue, choose **yes**.

Step 5 When the Catalyst 8510 MSR and LightStream 1010 is connected, select **Download Router Configuration** in the Router Software Loader dialog box.

Step 6 Select the appropriate file and click the radio button beside **Copy configuration to the router nonvolatile memory**. The Catalyst 8510 MSR and LightStream 1010 should now contain the startup configuration it had before the initial RSL connection.

Step 7 Exit RSL.

Note In the steps above, the Catalyst 8510 MSR and LightStream 1010 configuration register (**config-register 0x***nnnn*) is not restored.

Note If you press **Ctrl-Alt-Delete** to quit RSL, the router configuration and the configuration register are not restored. However, the configuration file is not deleted from the PC. To restore the configuration file, follow the steps above, beginning with Step 2.

Alternatives to RSL

RSL is designed to work with a PC running Microsoft Windows 95 and is the recommended method for downloading software to the Catalyst 8510 MSR and LightStream 1010; however, you can install the software using the TFTP process described in the following section.

Note The sample prompts and output shown in the following sections might not be identical to the prompts displayed on the Catalyst 8510 MSR and LightStream 1010 console.

Installing the Catalyst 8510 MSR and LightStream 1010 Software by Using a TFTP Server Application

Use this TFTP server application method as an alternative method to install the Catalyst 8510 MSR and LightStream 1010 software from the CD-ROM. You can perform this procedure by using a PC (running Microsoft Windows 95 or Microsoft Windows 3.1), a Macintosh, or a UNIX system. You can use either the **copy tftp flash** or **copy rcp flash** command to download the software to the Catalyst 8510 MSR and LightStream 1010.

First, obtain a TFTP application or a remote copy protocol (rcp) application to set up your computer as a TFTP server or an rcp server. If you are using a PC running Windows 95, you can use RSL or the TFTP server included on the feature pack CD-ROM to install the Catalyst 8510 MSR and LightStream 1010 software. For other operating systems, a number of TFTP or rcp applications are available from independent software vendors, or as shareware on the World Wide Web.

Note To use an rcp application, follow the same procedure below, but substitute “rcp” for “TFTP”and use the **copy rcp flash** command instead of the **copy tftp flash** command.

Step 1 Install any TFTP server application on the PC. (A PC application is included on the feature pack CD-ROM for Microsoft Windows 95 only.)

Step 2 Start the TFTP server application on the PC by double-clicking the application icon or its .exe filename.

Step 3 Set up the PC as a TFTP server by using the TFTP server application setup or configuration facility.

Most TFTP server applications include a setup facility that allows you to specify the PC as a server. For example, from the TFTP menu of one application, select **Settings** to display a panel. To configure the local PC as a server, select the Server checkbox.

Select a root directory where the Cisco IOS files reside (for example, d:\cpswinst\images).

Caution Make sure you set up your local PC as a TFTP server. If you do not, you cannot perform the copy procedure. This caution applies to both TFTP and rcp.

Step 4 Establish a console session from your local PC (which is now configured as a TFTP server) to the Catalyst 8510 MSR and LightStream 1010 by using one of these methods:

- Connect the PC com port to the Catalyst 8510 MSR and LightStream 1010 console port.

  This is the recommended method. When you reload the Catalyst 8510 MSR and LightStream 1010 with the new image in Step 13, you remain connected to the Catalyst 8510 MSR and LightStream 1010.
- Establish a Telnet session from the PC to the Catalyst 8510 MSR and LightStream 1010. If you choose to use Telnet, your connection to the Catalyst 8510 MSR and LightStream 1010 will be lost when it is reloaded.

Caution Make sure that your PC is set up to communicate with the connected device through its network port.

Step 5 Connect your PC's LAN port to the corresponding LAN port on the Catalyst 8510 MSR and LightStream 1010. If you are making a direct connection to the Catalyst 8510 MSR and LightStream 1010 via Ethernet or Fast Ethernet, use an Ethernet crossover cable. If connecting to the Catalyst 8510 MSR and LightStream 1010 via an Ethernet or Fast Ethernet hub or Token Ring MAU (hub), use straight-through cable.

Note We recommend that you back up the Catalyst 8510 MSR and LightStream 1010 configuration before upgrading the Catalyst 8510 MSR and LightStream 1010 software.

Step 6 At the prompt, enter your password:

```
Password: <password>
```

Step 7 At the prompt, enter **enable**; then enter your password:

```
Router# enable
Password: <password>
```

Step 8 At the prompt, enter the following command to copy the new software image from the PC CD-ROM drive to the Catalyst 8510 MSR and LightStream 1010:

```
Router# copy tftp flash
```

In the next series of steps, you download the Cisco IOS Release 12.0(10)W5(18b) images that you want installed on your Catalyst 8510 MSR and LightStream 1010.

Step 9 At the prompt, enter the IP address of your PC, as shown in the following example:

```
Address or name of remote host [255.255.255.255]? 131.108.1.1
```

This is the IP address of your local PC, not that of the Catalyst 8510 MSR and LightStream 1010.

Step 10 At the prompt, enter the filename of the Cisco IOS Release 78-10701-02 image to be copied to the Catalyst 8510 MSR and LightStream 1010, as shown in the following example:

```
Source file name? cat8510m-wp-mz.120-10.W5.18b.bin
```

This example specifies the UNIX image name of the IP feature set for Catalyst 8510 MSR and LightStream 1010 (as shown in Table 4 in the "Feature Pack Overview Table" section on page 5).

Step 11 At the prompt, enter the destination UNIX image filename and press **Enter**.

This is the name of the image file on the Catalyst 8510 MSR and LightStream 1010—not the full pathname of the image on the CD-ROM attached to the PC. Refer to Table 4 in the "Feature Pack Overview Table" section on page 5 for the UNIX image filename.

```
Destination file name [cat8510m-wp-mz.120-10.W5.18b.bin]?
```

During the transfer process, the software displays messages indicating that it has accessed the file you have specified and is loading it.

Step 12 At the prompt, enter **yes** if you want to erase the existing image copy resident in the Catalyst 8510 MSR and LightStream 1010 Flash memory before copying the new one.

```
Erase flash device before writing? [confirm] yes
```

The entire copying process takes several minutes and differs from network to network.

The exclamation point (!) indicates that the copy process is taking place. Each exclamation point (!) indicates that ten packets have been transferred successfully. A checksum verification of the image occurs after the image is written to Flash memory.

Step 13 Enter the **reload** command to reload the Catalyst 8510 MSR and LightStream 1010:

```
Router# reload
```

After the reload is complete, the Catalyst 8510 MSR and LightStream 1010 should be running the required Cisco IOS image. Use the **show version** command to verify it.

Documentation Updates

An *Update to the ATM Switch Router Command Reference* publication was created to reflect information added after printing the manual.

Related Documentation

The following sections describe the documentation available for the LightStream 1010 ATM switch and Catalyst 8510 MSR. Typically, these documents consist of hardware installation guides, software installation guides, Cisco IOS configuration and command references, system error messages, and feature modules, which are updates to the Cisco IOS documentation. Documentation is available as printed manuals or electronic documents, except for feature modules, which are available online only.

The most up-to-date documentation can be found on the Web via Cisco Connection Online (CCO) and the Documentation CD-ROM. These electronic documents might contain updates and modifications made after the hard-copy documents were printed.

These release notes should be used in conjunction with the documents listed in these sections.

- Platform Documents, page 12
- Software Documents, page 13

Platform Documents

Following is a list of the platform-specific documentation available for the LightStream 1010 ATM switch and Catalyst 8510 MSR:

- *ATM Port Adapter and Interface Module Installation Guide*
- *Guide to ATM Technology*
- *Processor Installation Guide*
- *Quick Reference for the Catalyst 8510 and LightStream 1010 Hardware Information*

Software Documents

Following is a list of the software documentation available for the LightStream 1010 ATM switch and Catalyst 8510 MSR:

- *ATM Switch Router Command Reference*
- *ATM Switch Router Software Configuration Guide*
- *ATM Switch Router Quick Software Configuration Guide*
- *ATM Switch Troubleshooting Guide*
- *Information Roadmap*

Obtaining Documentation

World Wide Web

You can access the most current Cisco documentation on the World Wide Web at http://www.cisco.com. Translated documentation can be accessed at http://www.cisco.com/public/countries_languages.shtml .

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM is updated monthly. Therefore, it is probably more current than printed documentation. The CD-ROM package is available as a single unit or as an annual subscription.

Ordering Documentation

Registered CCO users can order the Documentation CD-ROM and other Cisco Product documentation through our online Subscription Services at http://www.cisco.com/cgi-bin/subcat/kaojump.cgi.

Nonregistered CCO users can order documentation through a local account representative by calling Cisco's corporate headquarters (California, USA) at 408 526-4000 or, in North America, call 800 553-NETS (6387).

Obtaining Technical Assistance

Cisco provides Cisco Connection Online (CCO) as a starting point for all technical assistance. Warranty or maintenance contract customers can use the Technical Assistance Center. All customers can submit technical feedback on Cisco documentation using the web, e-mail, a self-addressed stamped response card included in many printed documents, or by sending mail to Cisco.

Cisco Connection Online

Cisco continues to revolutionize how business is done on the Internet. Cisco Connection Online is the foundation of a suite of interactive, networked services that provides immediate, open access to Cisco information and resources at anytime, from anywhere in the world. This highly integrated Internet application is a powerful, easy-to-use tool for doing business with Cisco.

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Customers and partners can self-register on CCO to obtain additional personalized information and services. Registered users may order products, check on the status of an order and view benefits specific to their relationships with Cisco.

You can access CCO in the following ways:

- WWW: www.cisco.com
- Telnet: cco.cisco.com
- Modem using standard connection rates and the following terminal settings: VT100 emulation; 8 data bits; no parity; and 1 stop bit.
  - From North America, call 408 526-8070
  - From Europe, call 33 1 64 46 40 82

You can e-mail questions about using CCO to cco-team@cisco.com.

Technical Assistance Center

The Cisco Technical Assistance Center (TAC) is available to warranty or maintenance contract customers who need technical assistance with a Cisco product that is under warranty or covered by a maintenance contract.

To display the TAC web site that includes links to technical support information and software upgrades and for requesting TAC support, use www.cisco.com/techsupport.

To contact by e-mail, use one of the following:

Language	E-mail Address
English	tac@cisco.com
Hanzi (Chinese)	chinese-tac@cisco.com
Kanji (Japanese)	japan-tac@cisco.com
Hangul (Korean)	korea-tac@cisco.com
Spanish	tac@cisco.com
Thai	thai-tac@cisco.com

In North America, TAC can be reached at 800 553-2447 or 408 526-7209. For other telephone numbers and TAC e-mail addresses worldwide, consult the following web site: http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml.

Software Configuration Tips on the Cisco Technical Assistance Center Home Page

If you have a CCO log-in account, you can access the following URL, which contains links and tips on configuring your Cisco products:

http://www.cisco.com/kobayashi/technotes/serv_tips.shtml

This URL is subject to change without notice. If it changes, point your Web browser to CCO, press **Login**, and click on this path: **Technical Assistance Center: Technical Tips**.

The following sections are provided from the Technical Tips page:

- Access Dial Cookbook—Contains common configurations or recipes for configuring various access routes and dial technologies.
- Field Notices—Notifies you of any critical issues regarding Cisco products and includes problem descriptions, safety or security issues, and hardware defects.
- Frequently Asked Questions—Describes the most frequently asked technical questions about Cisco hardware and software.
- Hardware—Provides technical tips related to specific hardware platforms.
- Hot Tips—Describes popular tips and hints gathered from the Cisco Technical Assistance Center (TAC). Most of these documents are available from the TAC Fax-on-demand service. To reach Fax-on-demand and receive documents at your fax machine from the United States, call 888 50-CISCO (888 502-4726). From other areas, call 650 596-4408.
- Internetworking Features—Lists tips on using Cisco IOS software features and services.
- Sample Configurations—Provides actual configuration examples that are complete with topology and annotations.

Documentation Feedback

If you are reading Cisco product documentation on the World Wide Web, you can submit technical comments electronically. Click **Feedback** in the toolbar and select **Documentation**. After you complete the form, click **Submit** to send it to Cisco.

You can e-mail your comments to bug-doc@cisco.com.

To submit your comments by mail, for your convenience many documents contain a response card behind the front cover. Otherwise, you can mail your comments to the following address:

Cisco Systems, Inc.
Document Resource Connection
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate and value your comments.

This document is to be used in conjunction with the documents listed in the "Related Documentation" section.